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ABSTRACT

Total quality management (TQM) was employed to improve the collection, storage, and use of racial/ethnic information at Cornell University. The initiative began with the task of standardizing ethnic codes across a number of university systems. The project to improve race/ethnicity reporting was undertaken by a team representing various university offices. The work of the team and issues encountered are discussed, with attention to a seven-step problem-solving methodology. This approach involved: (1) identifying the problem, (2) breaking into smaller segments to determine where improvement is needed, (3) identifying root causes of the problem and potential corrective actions, (4) planning steps to reduce the problem's severity, (5) reexamining the indicator and assessing efficacy of countermeasures, (6) preventing recurrences of the problem, and (7) reviewing what has been learned and possible applications to other problems. After implementing two of three proposed countermeasures, the incidence of unreported racial/ethnic data among entering freshmen was reduced from approximately 15 percent to less than 5 percent. Initial barriers are also noted, which resulted from team members' not having a shared perspective and understanding of the infrastructure surrounding racial/ethnic student data. A questionnaire for obtaining information on race/ethnicity is appended. (Contains 12 references, 5 tables and 5 figures.) (SW)

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Using TQM to Improve the Quality of Race/Ethnicity Reporting

Prepared for the 35th Annual Forum
of the Association for Institutional Research

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Jean Endo
Editor
AIR Forum Publications

Using TQM to Improve the Quality of Race/Ethnicity Reporting

Abstract

This paper will describe how the tools, techniques, and principles of Total Quality Management (TQM) were used to address a significant cross-functional problem facing potentially many institutions of higher education; the collection, storage, and use of racial/ethnic information. After implementing two of the three proposed countermeasures, the incidence of unreported racial/ethnic data among entering freshmen was reduced from approximately 15 percent to less than 5 percent. In addition to describing the problem-solving process that was employed and the ensuing results, the authors also discuss the internal and external politics of decision-making and policy implementation that were inextricably intertwined with this effort.

Introduction

As part of the inaugural phase of a continuous quality improvement program at Cornell University, a cross-functional team was formed to assess the way the institution collected, stored, and used racial/ethnic information. The team -- known as the Quality Improvement Process Ethnicity Team (QIP-ET) -- consisted of representatives from the university's admissions, human relations, human resources, information technologies, institutional planning and research, and registrar functions. The original charge to the team was to determine what could be done about "standardizing ethnic codes" across the multiplicity of systems in use at the institution. As a direct consequence of the training received prior to the first team meeting -- and its clear message not to just treat symptoms, but to identify and eliminate the systemic causes of problems -- the team members directed their attention to a somewhat broader question: "what about the ways in which the university collects, stores, and uses racial/ethnic information needs to be improved?"

A seven-step problem solving methodology, adapted to the higher education environment by a consulting firm and taught to the team during a two-day training session, was employed to address that question. This process, which will be discussed in more detail in a later section, was both data-driven and customer-focused. Decisions made at all steps following the first one were essentially based on the factual evidence produced in the stage immediately preceding. Although the process required considerable time, it did provide a means of progressively limiting the locus of inquiry to only the most salient aspects of the problem. The emphasis on customer needs also

compelled the team to consider the problem from both the user and provider perspectives and to take those into account when solutions were proposed and evaluated.

The team began its work and met for the first time in June of 1992. It had successfully completed most of the responsibilities directly within its purview by December, 1994, some 30 months after its initial meeting. During the intervening 32 month time period, the team had formally convened 74 times and prepared for and made four presentations to various groups of the university's senior administrators including one that was attended by the president, the provost, and deans of several of its colleges and professional schools. Its final set of recommendations was approved in principle in February of 1995, although some have not been fully implemented as of the writing of this paper.

The Institutional Context

Much of the impetus behind forming the team in the first place arose from difficulties and frustrations encountered when administrative offices needed to access or report data on the racial/ethnic composition of the university's student population or of a particular subgroup. Data on many students were not available either from the undergraduate admissions system or from the student information system (SIS). These two systems were physically separate from each other and were maintained by two different administrative units -- the Undergraduate Admissions Office (UAO) and the Office of the University Registrar (OUR). Moreover, codes in the SIS were designed to accommodate governmental reporting requirements while the UAO coding scheme reflected that office's more specific marketing and recruitment needs. However, racial/ethnic information was only obtained when students completed their initial application for admissions and this data was later electronically fed or "bridged" annually to SIS, along with other information, for students who had been accepted and who had declared their intention to enroll at Cornell. Because these systems did not have a common coding scheme (see Table 1), a significant portion of the racial/ethnic data were transformed or re-coded when this transfer took place. In some instances, this simply meant a direct change in a code, while in others it meant that entire categories were combined or lost entirely. It is also important to note that this transformation took place on the SIS input side and that data integrity was obviated for this one item.

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* **Insert Table 1 about here** *

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Various decisions made about the race/ethnicity data element over the past several years illustrate how the two systems were functionally integrated, for certain purposes, even though they were administered separately. One decision in particular involved assigning students who did not disclose their race/ethnicity on their admissions application to the white category in the UAO system as was routinely done before 1989. Obviously, since considerable numbers of those students were not white, using this category as the default made it appear as if white applicants were more common than they actually were, both in absolute terms and in relation to students in the other categories. This was also the case for the student body as a whole since that information was carried over into SIS. Although this practice was ended in 1990, when the racial/ethnic status of students who didn't report was left blank, its influence on SIS persisted until the three subsequent freshman classes had been enrolled.

Another decision that had an adverse effect on the university's ability to enumerate students according to their race/ethnicity was to allow students to assign themselves to more than one racial/ethnic category when they completed the application for admission. Beginning with those applying to enter Cornell in the Fall of 1993, students selecting two categories to classify themselves were identified as "bicultural" while students choosing three or more categories were assigned to the "multicultural" group. Because no provision had been made to add categories to SIS, when the admissions data were transferred into SIS, that portion of the student's record was left blank, the operational equivalent of placing them in the unreported category. Other options were not available because a student's actual responses were not retained and because the SIS had no other basis for assigning them. Important information on individual students was lost and the university's statistics on race/ethnicity continued to be distorted to an unknown degree.

The Larger Context

Institutional concerns were not the only reasons driving the team to consider more than just the coding schemes used within our existing data systems in addressing how we collected, stored, and utilized racial/ethnic data. An editorial essay introducing a

special issue of *Discover* devoted to race and ethnicity most aptly characterizes the larger context by suggesting that "our society is obsessed with race and confused by it" (Hoffman, 1994, p. 4).

The origins of most present systems of racial/ethnic classification can be traced to the turn of the nineteenth century and the German anatomist and naturalist Johann Frederick Blumenbach, who was not particularly racist in his thinking (Gould, 1994). However, the polemicists of inherent racial distinctions, including Joseph-Arthur, comte de Gobineau -- who Gould (1995, p. 12) calls "the grandfather of modern academic racism" -- were quick to attempt to take what was originally intended to be more or less neutrally scientific distinctions and politicize them.

Since 1977 the reporting of racial and ethnic data to the federal government -- and virtually by default to most everyone else -- has been governed by the Office of Management and Budget (OMB) Statistical Directive 15, which identifies four groups of American citizens (American Indian or Alaskan Native; Asian or Pacific Islander; Black; and White) as well as providing the opportunity to designate whether or not an individual in one of these four racial categories is of Hispanic origin. However, a growing proportion of the population of the United States can no longer -- with good conscience -- slot themselves into but one of the federal government's approved racial categories (Wright, 1994; Wheeler, 1995). In fact the number of people who checked "other" increased 45 percent between the 1980 and 1990 census (Sándor, 1994).

The very fact that there is little agreement about whether we are concerned in our data collection, storage, and reporting about race or ethnicity reflects a fundamental "confusion between biological and cultural heredity" (Marks, 1994). As a result, being forced to "select one" causes particular problems for individuals whose parents are not from identical racial and ethnic backgrounds (which is just about all of us). In spite of the difficulties this may cause federal and state governments in terms of apportioning funding to particular groups, the OMB is under pressure to change the current classification structure to at least allow for a 'multiracial' category on the 2000 census (Teegardin, 1994; Worthington, 1994). The State of Georgia has chosen not to wait for OMB to make up its mind, for beginning on 1 July 1994

> all written forms, applications, questionairres, and other written documents or materials produced by or for or used by any state agency which requests

> information on the racial or ethnic identification of a respondent and which contain an enumeration of racial and ethnic classifications from which such respondent must select one shall include among their choices the classification "multiracial." (Multiracial Classification Act, 1994, § 50-18-135 (b))

Additionally, the current OMB approved categories themselves, as well as their definition (or lack thereof), can cause the process of selecting just one to be rather inconsistent. This phenomenon is not new, for at least one study from the early 1970s found that slightly more than one-third of those individuals who completed a census survey in consecutive years changed the reporting of their racial classification (Shreeve, 1994).

These factors and others have made the collection, storage, and use of racial/ethnic data a virtual political hot potato. All this likely contributed to he leadership of at least one group -- the American Association of Collegiate Registrars and Admission Officers (AACRAO) -- to recommend doing away with gathering and reporting racial/ethnic data. In response to an Advance Notice of Proposed Review and Possible Revision of OMB's Statistical Policy Directive Number 15, AACRAO's President and Executive Director instead stressed a need to "emphasize our similarities, rather than our differences" (AACRAO, 1994, p. 1).

As a team, we understood this was a particularly thorny issue, and one in which we probably could not propose a solution that would please everyone. Nevertheless, even absent a need for this data for external (federal) reporting purposes, this information helps to inform our own internal decision making in important ways. Our current practices were obviously less than ideal and were at least at times a source of confusion and consternation for our customers. But we were convinced there was a better way to collect, store, and judiciously use racial/ethnic information.

Overview of the Process

The team applied one of the many variants of a standard TQM approach to address the issue of race/ethnicity reporting. The QI or quality improvement story, as it was called, consisted of seven steps, each characterized by a unique objective, characteristic activities, and sets of prescribed outcomes (see Table 2). Unless circumstances justified a departure from this form of the methodology, the steps were completed sequentially

and one was not started until the step preceding it had been finished. Formal presentations to a "lead" or leadership team, composed of the supervisors or unit managers of the problem-solving team's members, were required at the end of Steps 2, 4, and 7. A trained facilitator was assigned to the team to assist with group dynamics and to provide whatever support might have been necessary. In the beginning, the team members made a concerted effort to establish trust and to demonstrate to one another that they could work effectively together. The team also endorsed a pledge that committed each of them to a collection of fundamental principles and conditions. For example, the team members agreed to treat each other with respect, to attend all meetings, to come to them prepared, and to start and end them on time. Decisions were reached by consensus and the team did not move forward until all members were comfortable with whichever option may have been selected. The degree of comfort wasn't necessarily the same for all members, since consensus provides for the possibility that someone might only marginally agree with a course of action and still allow the group to proceed.

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* **Insert Table 2 about here** *

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In Step 1 of the QI story, "Reason for Improvement," a team basically identifies a theme or broad problem area and determines a reason for devoting their attention to it. The team also establishes an indicator or an empirical referent for "tracking" the theme. The objective of Step 2, "Current Situation," is to stratify or decompose the problem into smaller or more manageable segments and establish how much improvement is necessary. The purpose of Step 3, "Analysis," is to identify the problem's possible root causes and isolate those that are "actionable." Potential mitigating or corrective actions are the focus of Step 4, "Countermeasures," where a team also formulates and plans whatever steps might have to be taken in order to reduce the problem's severity. Step 5, "Results," simply provides an opportunity to reexamine the indicator and assess the efficacy of the countermeasures. "Standardization," or Step 6, is concerned with preventing recurrences of the problem and could involve the development of a mechanism for periodically generating comparative data about the indicator. Next steps for the team are considered in Step 7, "Final Plans," and the members review what they've learned and how it could be applied to other problems within the organization.

The accomplishments of the team are recognized in Step 7, after which the team may be disbanded or given another problem to solve.

Completing the QI Story

Quality, as it is generally defined in the QI story, is the level of performance necessary to meet or exceed the customer's valid requirements. Within the context of this QI story, the team had some rather significant barriers to overcome before they could operationalize that concept and associate it with the problem they were asked to solve. Part of the difficulty was attributable to the team's cross-functional composition and the fact that its members did not have a shared perspective and understanding of the organizational and informational infrastructure within which racial/ethnic data on students appeared.

Even before work on Step 1 began, it was evident from each team member's individual experiences in this area that there were a host of significant issues related to the institution's methods for obtaining, storing, and utilizing the racial/ethnic information it gathers. However, each team member brought with them a somewhat parochial conception of the systems, problems, and their technical, social, and political ramifications. This led to talking about the many customers who both supply and or who may depend on racial/ethnic data and the "pain" they may experience as a result of the policies and practices that were in effect. Focusing on the customers and their needs, therefore, convinced the team that the problem could not be eliminated simply by developing a single coding scheme which could then be incorporated into the data systems containing the race/ethnicity data element. Coding may have been a critical aspect of the problem, but correcting that alone would not satisfy the customer's need for valid and reliable racial/ethnic data.

After completing an exercise in which the team developed a macro process flowchart of racial/ethnic data collection for both students and employees, we engaged in brainstorming to identify possible themes. Although over 20 potential themes emerged from this part of the process the one adopted was that "data on the race/ethnicity of students and employees are incomplete and/or inaccurate." In all, the following four indicators were thought to be necessary to fully represent the theme:

1. Data on the race/ethnicity of students are inaccurate;
2. Data on the race/ethnicity of employees are inaccurate;
3. Data on the race/ethnicity of employees are incomplete;
4. Data on the race/ethnicity of students are incomplete.

Very early in Step 2, the team realized that there were no data on the accuracy of either student or employee racial/ethnic status (though these data were subsequently gathered). The team also knew that it was virtually impossible for an employee not to have a racial/ethnic code attached to their records since, for an employee to be paid, the payroll system must include a racial/ethnic designation. It was relatively easy, however, to document the student/incomplete portion of the theme. To get a quick perspective, the team compared our institution with selected peers from data on hand that clearly indicated our incidence of missing/unreported data was substantially higher than most. The indicator data were then disaggregated or stratified according to student category (i.e., undergraduate, graduate, professional) for all students registered in fall 1992 as well as for new matriculants. This provided evidence that incomplete data were most heavily concentrated among the undergraduate segment of the student population (see Figure 1) and the team focused its attention here first.

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* **Insert Figure 1 about here** *

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The target, or desired level of improvement, was arrived at in Step 2 after contacting several other research institutions about their procedures for collecting racial/ethnic information and examining their data on matriculants with incomplete race/ethnicity (see Figure 2). This enabled the team to indirectly estimate the extent to which the institution's level of non-reporting might be reduced. Questions about the minimum number of students who would not disclose their race/ethnicity under any circumstances and the number of students who might be expected to provide this information to the university if they were given an opportunity after they enrolled here were critical to this discussion. A target of 5 percent of undergraduates with unreported race/ethnicity was selected because this was close to that of the institutions which employ "best" practices and would not involve a massive restructuring of the existing system for acquiring racial/ethnic information.

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* **Insert Figure 2 about here** *

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The following problem statement was established to guide subsequent work and to complete Step 2 of the QI story:

> "Ethnic (racial) data in the Student Information System are incomplete for approximately 10 percent of undergraduates. This rate makes it impossible to determine accurately the ethnic composition of the university's student body, as well as being indicative of student disaffection and staff difficulties with the system. A rate of 5 percent would allow the institution to take more advantage of external funding and better serve its reporting, planning, and decision making needs."

Having clearly articulated a problem statement, the team next focused its attention on the Step 3 analysis. The team ultimately used cause and effect or Ishikawa diagramming to establish the primary, actionable factors responsible for the university's unusually high rate of incomplete racial/ethnic data for its undergraduates. This technique required team members to ask, or to develop a hypothesis about, "why," in this case, 10 percent of undergraduates had no corresponding racial/ethnic information in SIS. For each answer, that same question was repeated. The process was continued until asking why led to an answer that did not reasonably lend itself to asking the question again. Once this point arrived, the path was retraced to determine if in fact there was a logical causal flow.

The team began Step 3 by brainstorming five major categories of the higher level cause and effect diagram as noted below and diagrammed in Figure 3:

1. Students don't complete ethnicity question on the Application for Admission
2. Racial/ethnic data are lost between the UAO system and SIS
3. Clerks don't enter ethnic code data
4. Racial/ethnic data are removed from SIS
5. Racial/ethnic data not verified by the student

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*** Insert Figure 3 about here ***

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Each major category was then subjected to the process described earlier to identify the actionable causes of incomplete racial/ethnic data (see Figure 4). The eleven that emerged from this part of Step 3 were:

1. No requirement that systems be compatible
2. No routine mechanism for verification
3. Return mail for Application for Admission part 2 required within 24 hours
4. Decision by UAO not to move SAT racial/ethnic data into Admissions system
5. Instructions on application do not provide opportunity to prioritize racial/ethnic selections
6. Location of ethnicity question on back page of Application for Admission
7. Multiple end-users requiring different identifiers for different purposes
8. Inconsistent categories that combine ethnic, racial and cultural categories
9. Insufficient review of options by Application for Admission form authors
10. Increased printing costs by increasing Application for Admission form length
11. Mapping to government reporting categories is problematic

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*** Insert Figure 4 about here ***

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The preceding list of eleven potential actionable root causes was pared to three through the use of a technique called multivoting and these were carried forward to Step 4.

After determining the systemic, root causes of the university's level of incomplete racial/ethnic information among its undergraduates, the team formulated the following four countermeasures:

1. Require all students to verify/update racial/ethnic information (in conjunction with other basic demographic data) the first time they access the university's online information system;

2. As part of the registration and orientation mailing to newly matriculating students, ask them to verify/update racial/ethnic data;
3. In transferring new student data from the undergraduate admissions system to the student information system (SIS), for all students who have a "blank" racial/ethnic identifier in the admissions system, if the student had earlier self-identified racial/ethnic status through SAT/ACT, this information should be transferred to SIS;
4. Modify existing student data systems and develop a university-wide set of racial/ethnic codes that will:
   a. Gather source data at the most disaggregated level;
   b. Honor the increasing preference and need for individuals to identify themselves in more than one racial/ethnic group;
   c. Permit the carrying of all codes across all systems; and
   d. Be supported by a newly created set of decision rules to aggregate raw data consistently for federal, state, and local reporting requirements.

Each of the four countermeasures was then evaluated in terms of its expected effectiveness and feasibility to determine which of them should be implemented (see Table 3). Step 4 was concluded by developing action plans for each of the three countermeasures that the team rated highest with respect to their anticipated effectiveness and feasibility (numbers 1, 3, and 4). A summary of the plan recommended for the first countermeasure, which provided students an opportunity to verify or update their race/ethnicity by accessing an online information system, is provided in Table 4.

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* **Insert Table 4 about here** *

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Countermeasures 1 and 3 were put into effect over the summer of 1994. Once this was accomplished, the team assembled the data necessary to complete Step 5. The initial set of results, which are reported in Figure 5, indicate that the third countermeasure alone reduced missing/unreported racial/ethnic among the fall 1994 entering class to 4.8 percent, slightly under the target of 5 percent established for all undergraduates, and considerably lower than the 14.8 percent recorded for freshmen matriculating in 1993. The rate among the three upperclasses went down from 13 percent to 12.3 percent in

response to countermeasure 1 (see Table 5). Given the magnitudes of these decreases, the team is extremely confident that the third countermeasure will push the percentage of students with incomplete racial/ethnic data below the targeted level by the fall of 1997 as each of the next three freshman classes is represented in the institution's undergraduate population. It also seems likely that the rate among current upperclasses will continue to decline as more students become accustomed to updating or confirming their records through electronic means. These trends will be monitored annually by the team to confirm the veracity of this hypothesis and to determine whether additional action may be necessary.

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* **Insert Figure 5 about here** *
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Work on the fourth countermeasure was suspended until after the other countermeasures were implemented even though it could have a very significant long-term effect on the rate of racial/ethnic reporting. This countermeasure was the only one directly addressing student concerns about disclosing this information and created the necessity for the admissions application to be substantially changed. Evidence from a survey that the team had conducted earlier indicated that students in particular racial/ethnic groups refused to classify themselves because they thought the decision about whether or not they were admissable should be based exclusively on academic merit or they assumed that their chances for admission would be jeopardized by providing the information. The university compounded the problem by not making it abundantly clear why it was asking students to supply those data, by locating the item in an optional portion of the application, and by placing the optional items below a confusing and lengthy disclaimer. The disclaimer, although legally mandated, may have inadvertently raised student suspicious about the university's reasons for asking them to identify themselves racially or ethnically. These factors combined to increase the probability that students would choose not respond to the question about their race and ethnicity or could overlook it when they completed the application for admission.

In the team's judgment, the university could not continue using a single question both to satisfy its many needs for racial/ethnic information and comply with governmental reporting regulations. A strong consensus emerged for students to have a wide range of options available and to be able to select as many of those as they wished. After considerable deliberation, which occurred at a 2-day retreat, the team recommended that all vehicles for gathering racial/ethnic information -- including the application for admission -- be modified to include the introduction and questions contained in Appendix 1. The team also established a decision rule for aggregately classifying students into federal reporting categories those students who select more than one category to describe themselves, rather than allowing them to go unreported, or to have to provide that information when they updated their records.

It will undoubtedly take awhile for the university to decide that it is willing to make such a radical restructuring to its full range of input vehicles, particularly its application for undergraduate admissions. The team will probably be reconvened to finish steps 5, 6 and 7 of the student QI story once this occurs as well as to establish how that intervention affected racial/ethnic reporting specifically.

The Problems and Politics of QI

The QIP-ET team was formed at the outset of the university's foray into TQM as one of a number of teams designed to improve the quality of the university's programs and services. Each team formed was supposed to be supported by and responsible to a leadership team (lead team). Each lead team had a designated team leader, formulated its own agenda, and held separate meetings. It's primary purpose was to enable any team under its guidance to accomplish its objectives by coordinating its activities, consulting on the selection of improvement opportunities, provide needed resources, serve as a technical advisor on problem-solving methodologies, and to pave the way for implementing agreed upon solutions.

In most cases the lead team to a problem solving team was the existing management group for a particular functional area. In our case, however, since we were a cross functional team, there was no naturally existing management group. This presented a significant logistical problem. While the individual members of our lead team were supportive of their team member(s) and the efforts of the team generally, since they

only had this reason to gather as a lead team they often found it difficult to manage calendars and actually meet regularly as a team.

This is not to say that existing management groups found it easier to function as lead teams. In general, at least at the early stages of the university's TQM program, it was far more difficult for a lead team to function successfully than for a task team to do so. In fact, and particularly for lead teams that were also regularly functioning management groups, the challenge of deciding when they were which sort of group and knowing how and when to draw the lines between the two types of activities was often inherently difficult. What was going on here was, in essence, the introduction of TQM as a subtle, yet fundamental attempt to initiate a fairly radical change in the practice of management and administration at the university (although it is not entirely certain this was understood *a priori*).

As a functioning management group the involved individuals are used to sharing information, identifying problems, crafting strategy/solutions, supervising the implementation of strategy/solutions, and ensuring the results. In a word they naturally tend to be very active, in a very visible sort of way. As a lead team, however their role and responsibility was very different. In essence lead teams delegate virtually all of the things they normally do as a management group to the problem solving team. They don't divest themselves of the accountability they hold as managers, but they delegate a sizable amount of "control" over actual "work," for it is the task team that is charged with:

1. identifying the problem or "reason for improvement" in Step 1;
2. documenting the problems' existence in assessing the "current situation" in Step 2;
3. setting the target for improvement in Step 2;
4. through systematic analysis, identifying the root causes of the problem in Step 3;
5. crafting strategy/developing countermeasures in Step 4;
6. overseeing implementation and verifying the results in Step 5;
7. searching for means of standardizing the processes/procedures to ensure the problem does recur and looking for other related areas where the same processes/procedures could be employed in Step 6 and Step 7.

The problem solving team is to do all of this in plain view of the lead team and jointly the two teams are to ensure that there are NO SURPRISES--in either direction. **BUT**, if what managers and management groups were used to doing -- and what typically got them into positions of management in the first place -- is now being delegated to problem solving teams, just what is it that lead teams were supposed to do? To a large degree this varied from lead team to lead team. Nevertheless, those management groups/lead teams that were most successful in making this transition did so because they recognized that their primary responsibility was to clear the way for the problem solving team to do what they had been charged to do. In addition, the successful management groups/lead teams learned to function in such a way that they weren't always trying to remember which "hat" they were supposed to be wearing. In essence, they threw away both their management group and lead team "hats" and instead wore a hybrid, one-style-fits-all-occasion chapeau.

As was mentioned earlier, the QIP-ET team formally met 74 times over a 32 month time span. At several points along the process this became an issue with senior management personnel who were not directly involved in the process, though not with our lead team. While at first blush 32 months might seem like an inordinately long time, this is an unfortunate metric for reckoning the team's progress and efficaciousness. Looked at a different way, this was approximately a 110 hour meeting-time commitment by the seven team members, which is equivalent to less than three weeks of work time. Could the same outcomes have been arrived at if we had been locked together in a room for three weeks? The answer is unequivocally no. In fact, the time that elapsed between meetings was often vital to making progress in allowing both for individual maturing of thought and for necessary external consultation.

In addition, interruptions in the process were quite common, particularly when the team was preparing for presentations to the lead team, when required data weren't readily available, while actions plans were being implemented, or during prime vacation periods. However, these "breaks" weren't often simple down time. For instance, during the approximately 4-month wait between steps 4 and 5, for example, the team returned to the theme and selected another dimension of the problem to solve. The team devoted this time to proceeding with another QI story through step 4, using the indicator "data on the race/ethnicity of employees are inaccurate." At that point, the team identified three countermeasures for reducing the incidence of incorrect racial/ethnic data on employees. The last recommendation was to develop a

university-wide set of racial/ethnic codes and apply these in systems containing employee information. This, of course, was the same as the last countermeasure that had been proposed for the problem of incomplete student data on race/ethnicity. The other two countermeasures would give employees an opportunity to self-report their race/ethnicity, as is currently done by students, and to verify or update that information.

Reflecting more globally on the institution's experience with attempting to utilize the principles of TQM, it is probably most accurate to say that while the larger institutional context was technically supportive of the effort, it did so with what appeared more often than not to indicate that the implementation of TQM was a rogue administrative activity. There were major successes from among the inaugural set of teams, not least of them the results from the QIP-ET team. But there were an equal number of teams that for a variety of reasons did not achieve tangible success.

The bottom line for this team, however, was a clear demonstration that not only could functional problems be solved successfully through the use of TQM, but that the process of cultural change within an institution can be effected using these principles. The tangible benefits of this team's activities have been outlined in detail above, some of the intangible benefits deserve at least a brief enumeration.

On a very simple level, the individuals on the QIP-ET team learned how to plan, conduct, and debrief meetings in an effective and efficient manner. We not only experienced the power and value of consensus, but we learned how to build it. We became proficient at critiquing ideas without criticizing people. We discovered how to discern when individuals were "quietly" disengaging from the task at hand and learned how to draw them back in. In essence we learned not to waste our own or other's time, and each of us took these new learned skills back to our "day jobs."

Most fundamentally, however, the QIP-ET team (and its lead team) began with a very narrow and highly parochial view of a wide spread problem. The individuals on both teams grew to understand that actions taken to make life easier in one area of the university didn't necessarily help others and in fact often proved counterproductive for themselves. Through systematically developing an understanding of the full system in which the particular problem existed and by insisting on empirical verification of the

systemic causes of highly visible symptoms we were collectively able to resolve a complex and politically charged problem.

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Table 1. Race/Ethnicity Codes in UAO and SIS

Race/Ethnicity	UAO code	SIS code
Asian American	D	A
African American	B	B
Puerto Rican	E	H
Mexican American	G	H
Other Hispanic	C	H
American Indian/Alaska Native	A	I
Caucasian	F	W
Non-Resident Alien	T	N
Multi-Cultural	J	"Blank"
Bi-Cultural	K	"Blank"
Non-Report		"Blank" (N if visa ne 001 or permanent resident)

Table 2. QI Story Steps, Objectives, and Outcomes

QI Story Step	Objective	Outcome
1. Reason for Improvement	Identify a theme and a reason for working on it	• Theme • Indicator
2. Current Situation	Select a problem statement and target for improvement	• Problem statement • Target • Presentation
3. Analysis	Root cause identification and verification	• Cause/effect diagram • Actionable root causes
4. Countermeasures	Plan and implement countermeasures that correct problem	• Countermeasure matrix • Action plan • Presentation
5. Results	Confirm that root causes have been reduced and target has been met	• Review indicator • Compare with target
6. Standardization	Prevent recurrence of problem	• Written guidelines • Monitoring system
7. Future plans	Plan response to other problems and evaluate team effectiveness	• Review learning • Presentation • Recognition

Table 3. Matrix of Countermeasures for Root Causes

Problem	Root Cause	Counter-measure	Effective-ness	Feasibility	Effectiveness X Feasibility	Action
10% Incomplete (Students)	No verification	CM #1 (Online system)	4	4	16	**Yes**
	No verification	CM #2 (Mailing)	2	1.5	3	No
	Don't use SAT/ACT data	CM #3 (Data transfer)	5	4	20	**Yes**
	Don't require that systems be compatible	CM #4 (System wide codes)	4	3	12	**Yes**

SCALE: 1 = None 2 = Somewhat 3 = Moderate 4 = Very 5 = Extreme

Table 4. Action Plan for Countermeasure 1

Component	Actions
Countermeasure	• Require all enrolled students to verify/update racial/ethnic information (in conjunction with other basic demographic information) the first time they access the online student system
Who	• Assistant Vice-President for Student and Academic Services, the administrator responsible for the system
How	• Create a screen to be seen the first time the online system is used to give the student the opportunity to verify and update certain demographic information that is not expected to change often such as: ethnicity, birthdate, gender, marital status, country of citizenship, emergency contact person, and their phone number • Record how often this option is used to add or change ethnicity so that the countermeasure's effectiveness can be measured • At the point of initial implementation all students with Net IDs would be requested to verify the screen of information suggested above. Subsequently, this screen will be seen only at a new user's first logon to the online system
When	• Fall term, 1994
Notification	• College registrars, students with Net IDs

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Table 5. Summary of Undergraduate Coding Changes, August 15, 1994 to September 16, 1994

Old Codes	New Codes Asian	Black	Hispanic	Am. Ind.	Nonresid	White	*Total*
Asian	0	1	0	3	0	4	***8***
Black	0	0	0	0	0	0	***0***
Hispanic	0	2	0	0	0	1	***3***
Am. Ind.	0	0	0	0	0	1	***1***
Nonresid	1	0	0	0	0	1	***2***
White	0	0	1	0	0	0	***1***
Blank	35	4	7	3	1	123	***173***
Total	***36***	***7***	***8***	***6***	***1***	***130***	***188***

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Figure 1. Pareto of Missing Racial/Ethnic Data by Student Category for Fall 1992 Registered Students

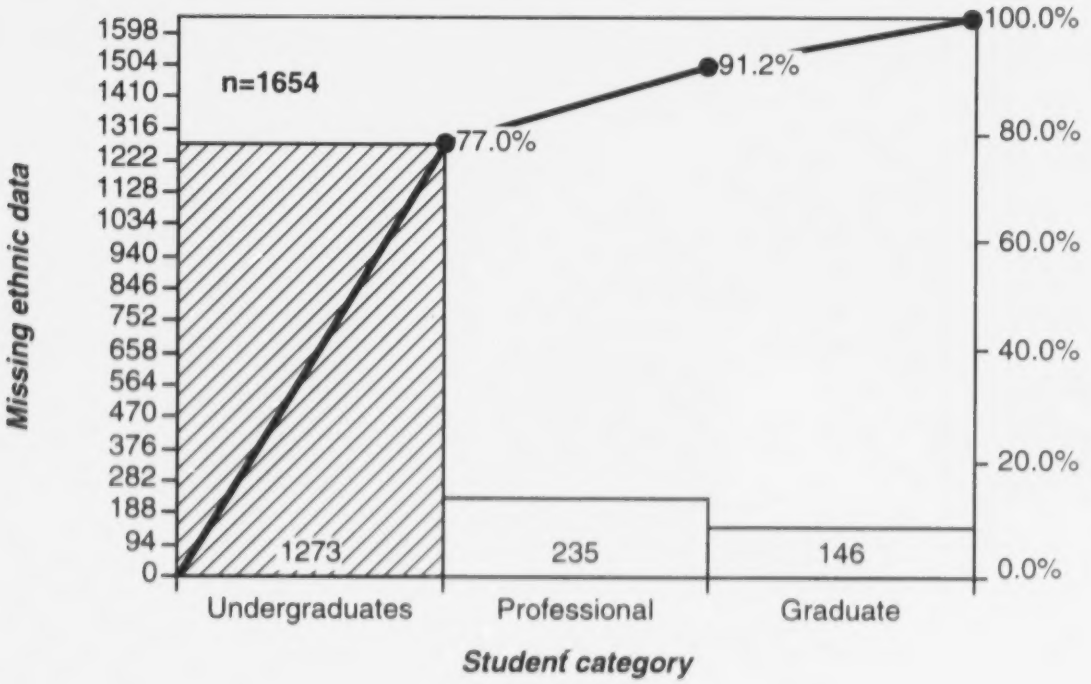

Figure 2. Fall 1992 Matriculants at Selected Institutions with Unreported Race/Ethnicity

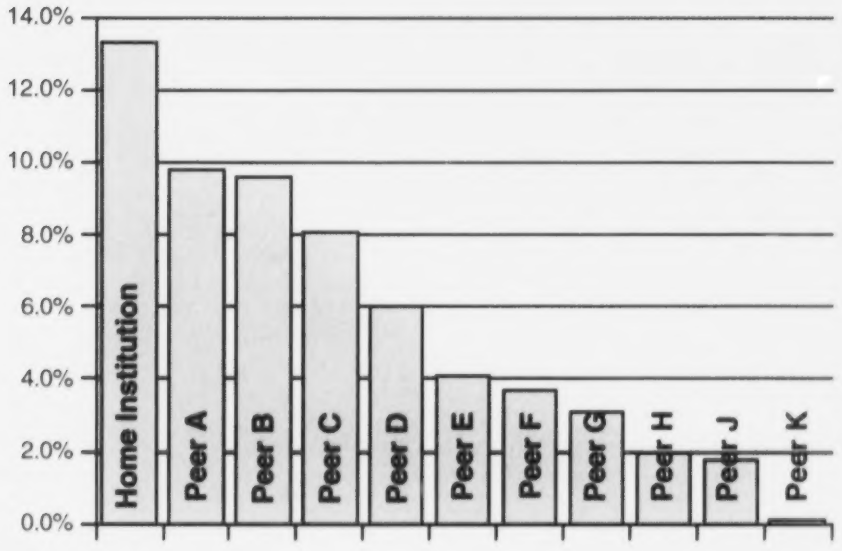

Figure 3. Cause and Effect Diagram of Major Sources of Incomplete Data

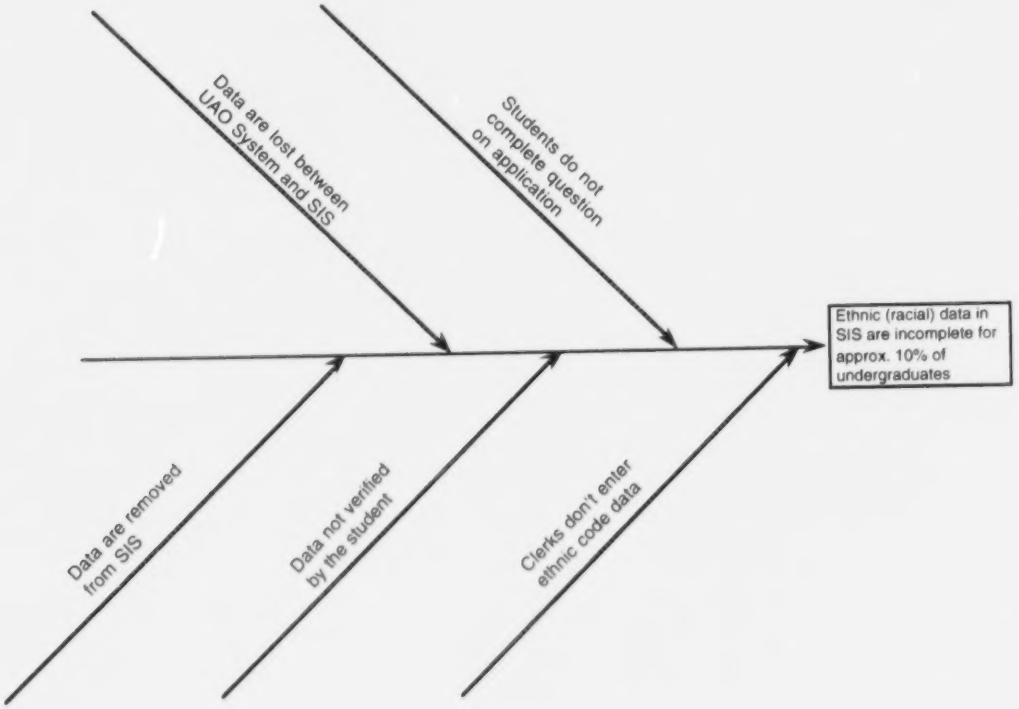
Data are lost between UAO System and SIS
Students do not complete question on application
Ethnic (racial) data in SIS are incomplete for approx. 10% of undergraduates
Data are removed from SIS
Data not verified by the student
Clerks don't enter ethnic code data

Figure 4. Cause and Effect Diagram Showing Actionable Root Causes

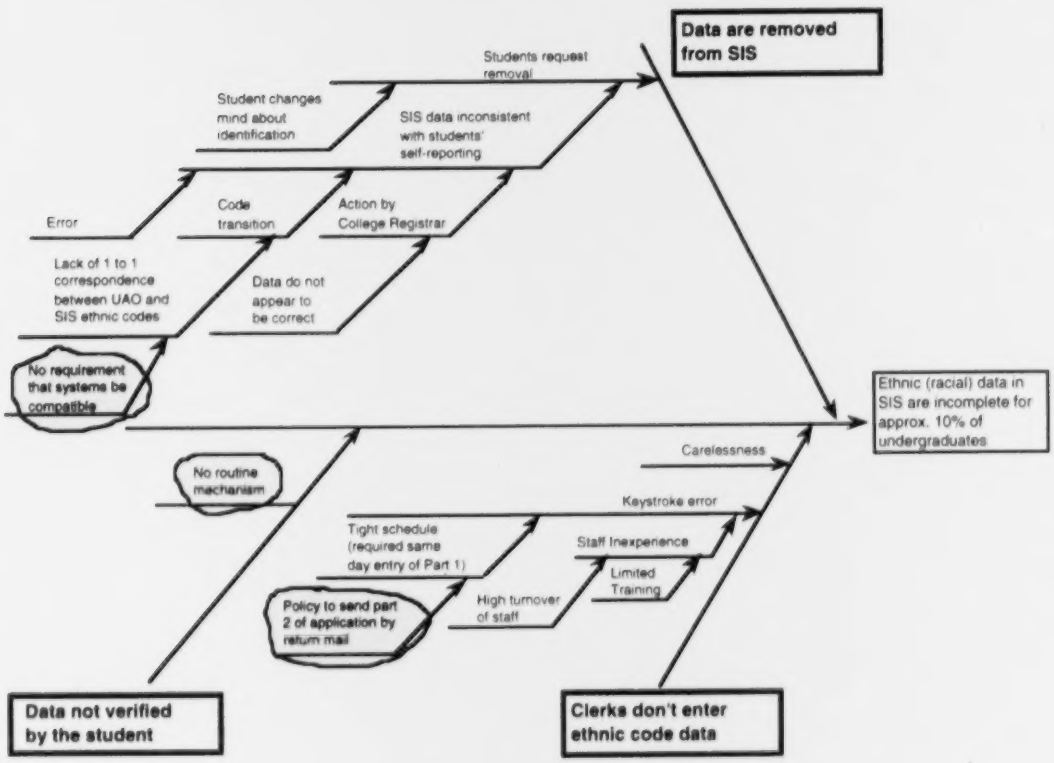
Data are removed from SIS
Students request removal
Student changes mind about identification
SIS data inconsistent with students' self-reporting
Error
Code transition
Action by College Registrar
Lack of 1 to 1 correspondence between UAO and SIS ethnic codes
Data do not appear to be correct
No requirement that systems be compatible
Ethnic (racial) data in SIS are incomplete for approx. 10% of undergraduates
Carelessness
Keystroke error
No routine mechanism
Tight schedule (required same day entry of Part 1)
Staff Inexperience
Limited Training
High turnover of staff
Policy to send part 2 of application by return mail
Data not verified by the student
Clerks don't enter ethnic code data

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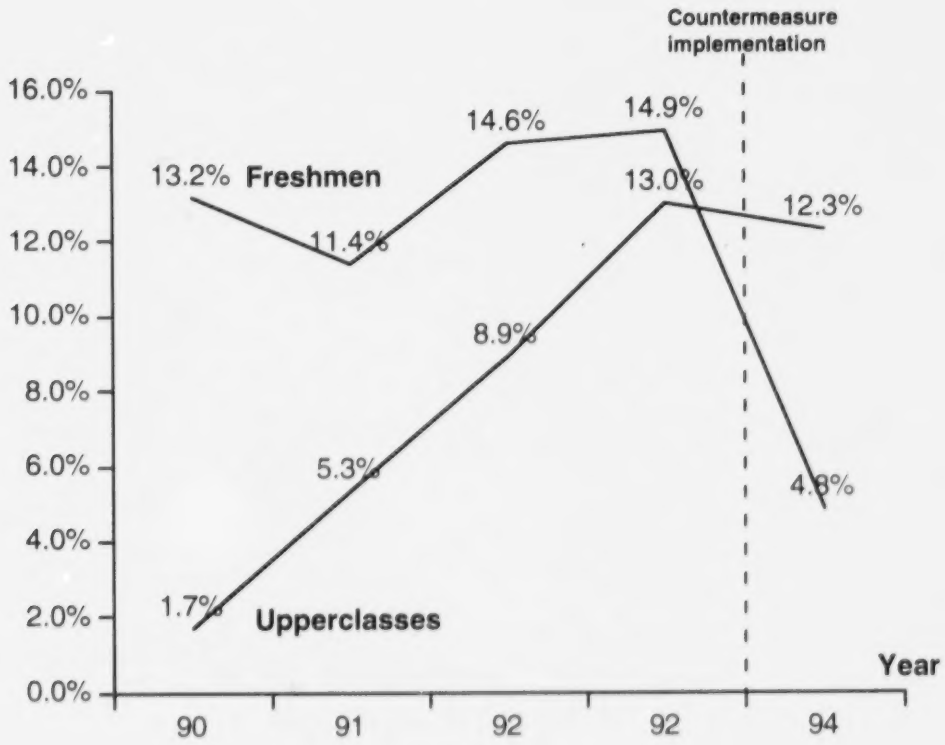
Figure 5. Students with Incomplete Racial/Ethnic Data, 1990-94



Appendix 1

Cornell University recognizes that, regarding race/ethnicity, no one question and no single list of categories can appropriately honor all identities or meet every need. Your cooperation in answering the following questions is appreciated.

1. Cornell University is required to report statistics by the following federally mandated racial/ethnic definitions. Please mark all with which you identify.

___ **American Indian or Alaskan Native** -- A person having origins in any of the original peoples of North America, and who maintains cultural identification through tribal affiliation or community recognition.

___ **Asian or Pacific Islander** -- A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or the Pacific Islands. This area includes, for example, China, India, Japan, Korea, the Philippine Islands, and Samoa. The Indian subcontinent takes in the countries of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Sikkim, and Bhutan.

___ **Black, not of Hispanic Origin** -- A person having origins in any of the black racial groups of Africa.

___ **Hispanic** -- A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race. Only those persons from Central and South American countries who are of Spanish origin, descent, or culture should be included in this category. Persons from Portugal, Brazil, Guyana, Surinam, or Trinidad would be classified according to their race.

___ **White, not of Hispanic Origin** -- A person having origins in any of the original peoples of Europe, North Africa, or the Middle East.

2. Cornell University strives to be a pluralistic community. Toward that end, we are interested in how you identify yourself from among the following. Please review the entire list and mark all that apply, regardless of where you live or were born.

Africa
___ African Black
___ African White
___ Other African, please specify:_____

North America
___ African American/Black
___ Alaskan Native/Aleut
___ Asian American
___ Chicano/Mexican American
___ Hawaiian Native
___ Indian, specify tribal affiliation:_____
___ Latino/Hispanic American
___ White
___ Other, please specify:_____

Other
___ Please specify:_____

Asia
___ Chinese
___ Filipino
___ Indic
___ Japanese
___ Korean
___ Middle Eastern Black
___ Middle Eastern White
___ Pacific Islander
___ Southeast Asian
___ Other Asian, please specify:_____

South America
___ Black
___ Indian, specify tribal affiliation:_____
___ Latino/Hispanic
___ White
___ Other, please specify:_____

Europe
___ European Black
___ Euro-Hispanic
___ European White
___ Other European, please specify:_____

Central America
___ Caribbean Black
___ Caribbean White
___ Cubano
___ Indian, specify tribal affiliation:_____
___ Latino/Hispanic
___ Mexican
___ Puerto Riqueño
___ Other, please specify:_____

Decision Rule for Aggregating to Federal Racial/Ethnic Categories

If an individual of US citizenship or permanent residency[1] selects more than one category in the first question -- for as long as external reporting requires each individual to be counted in only one category -- the individual will be assigned to the first of the categories selected from the following list:

1. American Indian
2. Black
3. Hispanic
4. Asian
5. White

The order of the list is determined on the basis of the lowest to highest proportions of these groups in the most recent decennial US Census.

[1] Also students with refugee status.